# Hardware Installation Guide for Cisco Media Experience Engine 3000

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**Americas Headquarters**
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
http://www.cisco.com
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 527-0883

Text Part Number: OL-17000-01

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# Preface

This preface describes the purpose of the *Hardware Installation Guide for Cisco Media Experience Engine 3000*, who should read it, how it is organized, and its document conventions.

This preface contains the following sections:


- Purpose, page vii
- Audience, page vii
- Organization, page viii
- Conventions, page viii
- Related Documentation, page ix
- Obtaining Documentation and Submitting a Service Request, page x


## Purpose

This installation guide explains how to prepare your site for installation, how to install a Cisco Media Experience Engine 3000 (Cisco MXE 3000) in an equipment rack, and how to maintain and troubleshoot the system hardware. After completing the hardware installation procedures covered in this guide, you will then use the appropriate related publications to configure your system. See the "Related Documentation" section on page ix.

## Audience

To use this installation guide, you should be familiar with internetworking equipment and cabling, and have a basic knowledge of electronic circuitry and wiring practices.

To complete the installation, including the software configuration for your Cisco MXE 3000 appliance, you should be familiar with basic networking principles, router configuration, and web page protocols.

**Warning** **Only trained and qualified personnel should be allowed to install, replace, or service this equipment.** Statement 1030

# Organization

This guide includes the following chapters:

| Chapter | Description |
|---|---|
| Chapter 1, "Introducing the Cisco MXE 3000" | Describes the physical properties and provides a functional overview of the Cisco MXE 3000. |
| Chapter 2, "Preparing to Install the Cisco MXE 3000" | Describes safety considerations and gives an overview of the installation and procedures that you should perform *before* the actual installation. |
| Chapter 3, "Installing the Cisco MXE 3000" | Describes how to install the hardware and connect the external network interface cables. |
| Chapter 4, "Installing Hardware Options for the Cisco MXE 3000" | Describes how to install options, such as and hard disk drives and DIMMs. |
| Chapter 5, "Troubleshooting the Cisco MXE 3000" | Describes troubleshooting procedures for the hardware installation. |
| Appendix A, "Cisco MXE 3000 Hardware Specifications" | Gives a summary of the hardware features and specifications. |
| Appendix B, "Maintaining the Cisco MXE 3000" | Describes how to maintain the Cisco MXE 3000. |

# Conventions

Command descriptions use the following conventions:

| Convention | Description |
|---|---|
| **boldface** font | Commands and keywords are in **boldface**. |
| *italic* font | Variables for which you supply values are in *italics*. |
| [ ] | Elements in square brackets are optional. |
| {**x** \| **y** \| **z**} | Alternative keywords are grouped in braces and separated by vertical bars. |
| [**x** \| **y** \| **z**] | Optional alternative keywords are grouped in brackets and separated by vertical bars. |
| string | A nonquoted set of characters. Do not use quotation marks around the string, or the string will include the quotation marks. |

Screen examples use the following conventions:

| Convention | Description |
|---|---|
| `screen` font | Terminal sessions and information the system displays are in `screen` font. |
| **`boldface screen`** font | Information you must enter is in **`boldface screen`** font. |

| Convention | Description |
|---|---|
| *italic screen* font | Variables for which you supply values are in *italic screen* font. |
| ^ | The symbol ^ represents the key labeled Control—for example, the key combination ^D in a screen display means hold down the Control key while you press the D key. |
| < > | Nonprinting characters, such as passwords, are in angle brackets. |
| [ ] | Default responses to system prompts are in square brackets. |
| !, # | An exclamation point (!) or a pound sign (#) at the beginning of a line of code indicates a comment line. |

Notes, cautionary statements, and safety warnings use these conventions:

**Note** Means *reader take note*. Notes contain helpful suggestions or references to materials not contained in this manual.

**Caution** Means *reader be careful*. You are capable of doing something that might result in equipment damage or loss of data.

**Warning**

**IMPORTANT SAFETY INSTRUCTIONS**

**This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device.** Statement 1071

**SAVE THESE INSTRUCTIONS**

# Related Documentation

The documentation for this product also includes the following hardware-related documents:

- *Quick Start Guide for Cisco Media Experience Engine 3000*
- *Regulatory Compliance and Safety Information for Cisco Media Experience Engine 3000*

The Cisco MXE 3000 appliance supports the Cisco Media Experience Engine software.

For a complete list of documentation, see the *Guide to Documentation for Cisco Media Experience Engine 3000* at the following URL:

http://www.cisco.com/en/US/products/ps9892/products_documentation_roadmaps_list.html

# Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, submitting a service request, and gathering additional information, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at:

http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html

Subscribe to the *What's New in Cisco Product Documentation* as a Really Simple Syndication (RSS) feed and set content to be delivered directly to your desktop using a reader application. The RSS feeds are a free service and Cisco currently supports RSS version 2.0.

CHAPTER 1

# Introducing the Cisco MXE 3000

This chapter provides a basic functional overview of the Cisco Media Experience Engine 3000 (Cisco MXE 3000) appliance and describes the hardware, major components, and front and back panel indicators and controls.

This chapter contains the following sections:


- Supported Products, page 1-1
- Hardware Features, page 1-1


**Note** In this guide, the terms server and appliance are used interchangeably.

## Supported Products

The Cisco Media Experience Engine 3000 appliance supports Cisco MXE 3000 Release 2.0 or later.

## Hardware Features

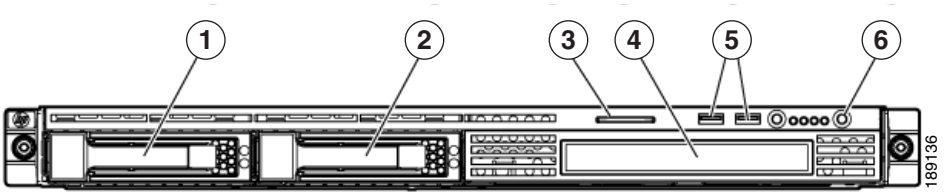
This section illustrates and describes the front and back panel controls, ports, and LED indicators on the Cisco MXE 3000. It contains the following topics:


- Front Panel Components and LEDs, page 1-2
- Back Panel Components and LEDs, page 1-3

# Front Panel Components and LEDs

Figure 1-1 shows the front panel components.

***Figure 1-1 Front Panel***




| | | | |
|---|---|---|---|
| **1** | Hard drive bay 1 (SATA device number 1) | **4** | 12.7-mm optical drive bay |
| **2** | Hard drive bay 2 (blank) | **5** | USB connectors (2) |
| **3** | Serial label pull tab | **6** | Power On/Standby button and system power LED |

Figure 1-2 shows the front panel LEDs.

***Figure 1-2 Front Panel LEDs***

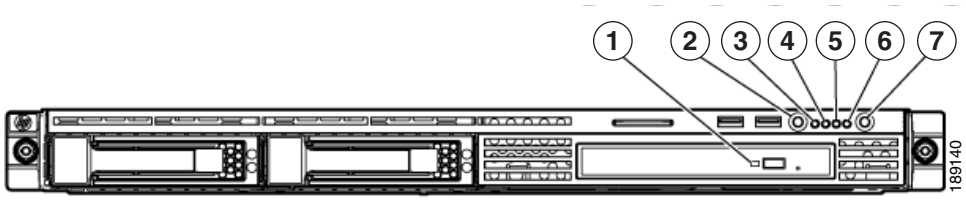



Table 1-1 describes the front panel LEDs and their functions.

***Table 1-1 Front Panel LED Descriptions***

| LED | | Color | State | Description |
|---|---|---|---|---|
| **1** | 12.7-mm optical drive activity LED | Green | On | Drive activity is normal. |
| | | Amber | On | Drive failure has occurred. |
| | | - | Off | No drive activity exists. |
| **2** | UID button/LED | Blue | On | Identification is activated. |
| | | Blue | Flashing | System is being remotely managed. |
| | | - | Off | Identification is deactivated. |

*Table 1-1 Front Panel LED Descriptions*

| LED | | Color | State | Description |
|---|---|---|---|---|
| 3 | Internal health LED | Green | On | System health is normal. |
| | | Amber | On | System health is degraded. |
| | | Red | On | System health is critical. |
| | | - | Off | System health is normal (when in standby mode). |
| 4 | NIC 1 link/activity LED | Green | On | Network link exists. |
| | | Green | Flashing | Network link and activity exist. |
| | | - | Off | No network link exists.<br>If power is off, the front panel LED is not active. View the LEDs on the RJ-45 connector. |
| 5 | NIC 2 link/activity LED | Green | On | Network link exists. |
| | | Green | Flashing | Network link and activity exist. |
| | | - | Off | No network link exists.<br>If power is off, the front panel LED is not active. View the LEDs on the RJ-45 connector. |
| 6 | Drive activity LED | Green | On | Drive activity is normal. |
| | | Amber | On | Drive failure has occurred. |
| | | - | Off | No drive activity exists. |
| 7 | Power On/Standby button and system power LED | Green | On | System is on. |
| | | Amber | On | System is shut down, but power is still applied. |
| | | - | Off | Power cord is not attached or power supply failure has occurred. |

# Back Panel Components and LEDs

Figure 1-3 shows the back panel components.

*Figure 1-3 Back Panel*

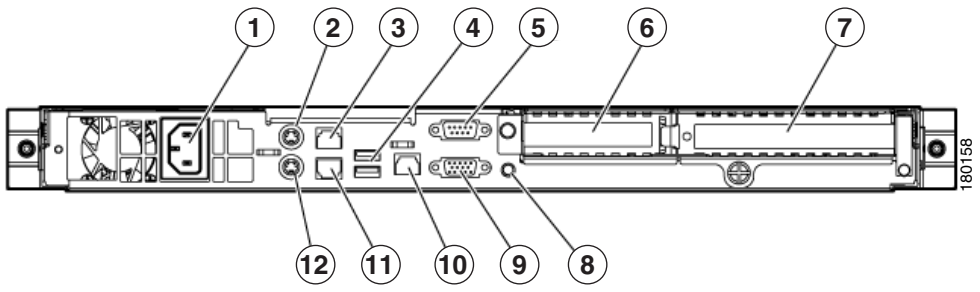


Table 1-2 identifies the back panel components.

*Table 1-2 Back Panel Components*

| | | | |
|---|---|---|---|
| **1** | Power cord connector | **7** | PCI Express expansion slot 4, (optional PCI-X), full-length |
| **2** | Mouse connector | **8** | UID button/LED |
| **3** | 10/100/1000 NIC 2 connector | **9** | Video connector |
| **4** | USB connectors (2) | **10** | Dedicated iLO 2 management port (optional) |
| **5** | Serial connector | **11** | 10/100/1000 NIC 1/shared iLO 2 management port |
| **6** | PCI Express expansion slot 5, low profile, half-length | **12** | Keyboard connector |

The Cisco MXE 3000 contains seven PCI expansion slots; however, slots 1, 2, 3, 6, and 7 are reserved. Table 1-3 provides the PCI expansion slot definitions for slots 4 and 5.

*Table 1-3 PCI Slot Definitions*

| Slot | Type | Length | Connector | Interconnect |
|---|---|---|---|---|
| 4 | PCI Express | Full | x8 | x8 |
| 4 | Optional PCI-X | Full | 133 MHz/3.3. V | 64 bit |
| 5 | PCI Express[1] | Half | x8 | x1 |

1. The Cisco MXE 3000 supports x8 PCI Express cards, but these cards will run at x1 speeds.

Figure 1-4 shows the back panel LEDs.

*Figure 1-4 Back Panel LEDs*

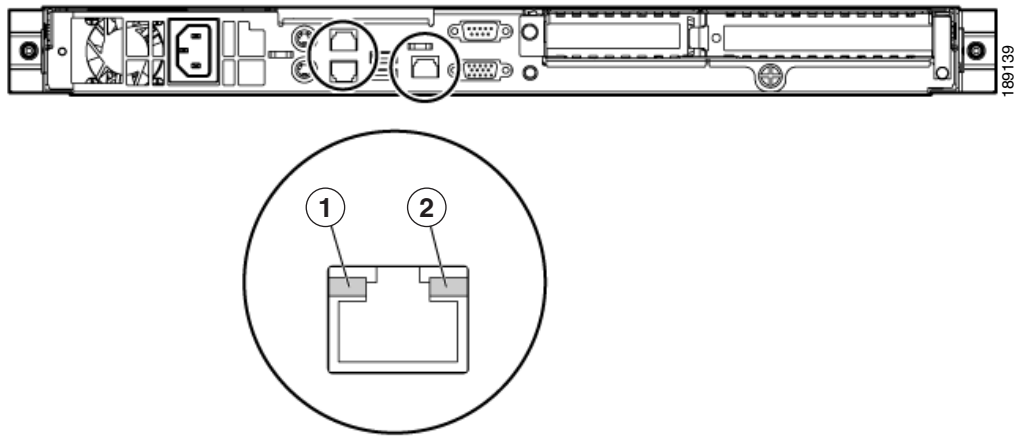


Table 1-4 describes the back panel LEDs and their functions.

*Table 1-4 Back Panel LEDs*

| LED | | Color | State | Description |
|---|---|---|---|---|
| 1 | NIC/iLO 2 activity | Green | On | Activity exists. |
| | | Green | Flashing | |
| | | - | Off | No activity exists. |
| 2 | NIC/iLO 2 link | Green | On | Link exists. |
| | | - | Off | No link exists. |

# Location of Ports and Connectors

The Cisco MXE 3000 appliance supports two Ethernet connectors on the back of the device. See "Ethernet Port Connectors" section on page 1-5, for more information.

Figure 1-3 shows the back panel ports and connectors.

**Warning** **To avoid electric shock, do not connect safety extra-low voltage (SELV) circuits to telephone-network voltage (TNV) circuits. LAN ports contain SELV circuits, and WAN ports contain TNV circuits. Some LAN and WAN ports both use RJ-45 connectors. Use caution when connecting cables.** Statement 1021

## Ethernet Port Connectors

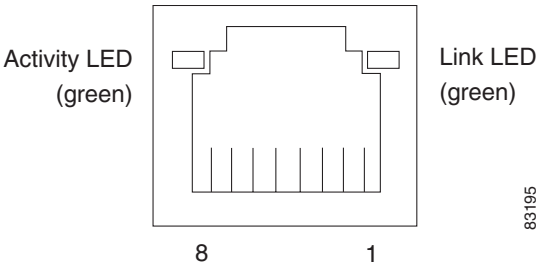
Connect a Category 3, 4, or 5 unshielded twisted-pair cable to an Ethernet connector (shown in Figure 1-5). 100BASE-TX and 1000BASE-T Fast Ethernet standards require Category 5 or higher cabling.

The Cisco MXE 3000 has three Ethernet connectors. Two of the Ethernet connectors are attached to the Ethernet controllers and the third connector is the systems-management Ethernet connector, which is not supported by the Cisco MXE 3000 software.

The Ethernet controllers are integrated on the system board. They provide an interface for connecting to a 10-Mbps, 100-Mbps, or 1-Gbps network and provide full-duplex (FDX) capability, which enables simultaneous transmission and reception of data on the network. If the Ethernet ports in the appliance support auto negotiation, the controllers detect the data-transfer rate (10BASE-T, 100BASE-TX, or 1000BASE-T) and duplex mode (full duplex or half duplex) of the network and automatically operate at that rate and mode. You do not have to set any jumpers or configure the controllers.

If a problem occurs with the primary Ethernet connection, all Ethernet traffic associated with this primary connection is automatically switched to the redundant Ethernet connection. If the applicable device drivers are installed, switching occurs without data loss and without user intervention.

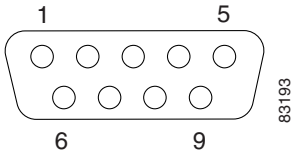
*Figure 1-5 Ethernet Port Connector*




## Serial Port Connector

The Cisco MXE 3000 has one serial port connector (shown in Figure 1-6). Use the serial port connector to connect a serial device.

*Figure 1-6 Serial Port Connector*




# System Board Components and LEDs

This section shows where the system board components are located, LED functions, and describes the system maintenance switch operating options.

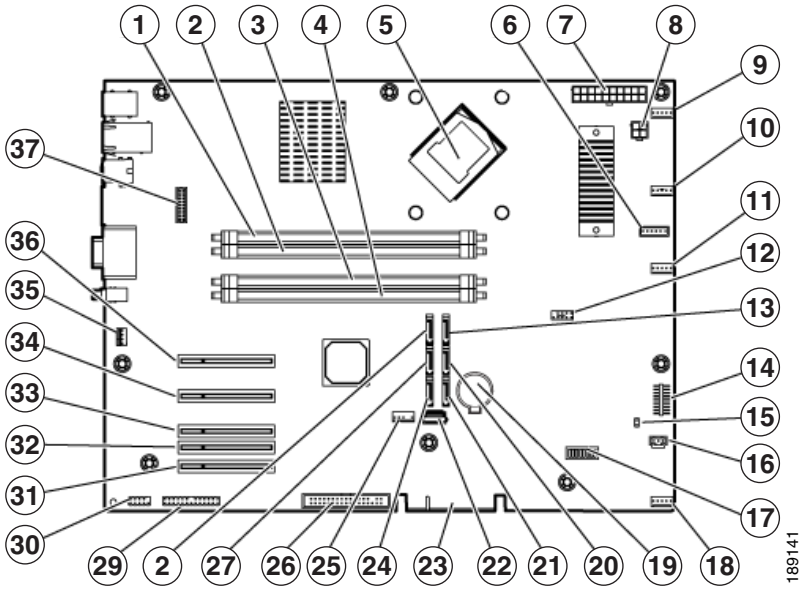
This section contains the following topics:


- System Board Components, page 1-7
- System Board LEDs, page 1-8
- System Maintenance Switch, page 1-9
- System Board Fans, page 1-10

# System Board Components

Figure 1-7 shows the layout of the system board components.

*Figure 1-7 System Board Components*




| | | | |
|---|---|---|---|
| **1** | DIMM slot 1 (bank A) | **20** | SATA connector 4 (hard drive) |
| **2** | DIMM slot 2 (bank B) | **21** | SATA connector 6 (optical drive)* |
| **3** | DIMM slot 3 (bank C) | **22** | Reserved |
| **4** | DIMM slot 4 (bank D) | **23** | Reserved |
| **5** | Processor socket | **24** | SATA connector 5 (optical drive)* |
| **6** | Reserved | **25** | Internal USB option connector |
| **7** | System power connector | **26** | Reserved |
| **8** | Processor power connector | **27** | SATA connector 3 (hard drive) |
| **9** | Fan 1 connector | **28** | SATA connector 1 (hard drive) |
| **10** | Fan 2 connector | **29** | Parallel option connector |
| **11** | Fan 3 connector | **30** | Serial option connector |
| **12** | Front USB cable connector | **31** | Reserved |
| **13** | SATA connector 2 (hard drive) | **32** | PCI Express expansion slot 4 |
| **14** | Front panel LED connector | **33** | PCI Express expansion slot 5** |
| **15** | NMI jumper | **34** | R served |
| **16** | Reserved | **35** | Reserved |

| | | | |
|---|---|---|---|
| **17** | System maintenance switch | **36** | Reserved |
| **18** | Fan 4 connector | **37** | Dedicated iLO2 optional module connector |
| **19** | System battery | **—** | — |

* The serve supports one optical drive that can be connected to either SATA connector 5 or SATA connector 6.

** x8 PCI Express cards are supported, but will run at x1 speeds.

# System Board LEDs

Figure 1-8 shows the system board LEDs.

***Figure 1-8 System Board LEDs***

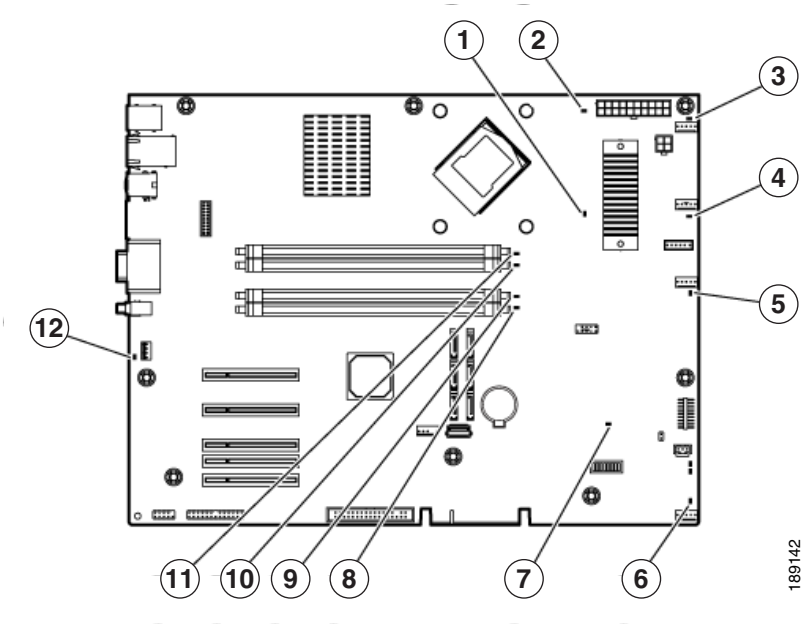



Table 1-5 describes the system board LED functions.

***Table 1-5 System Board LEDs***

| LED | | Color | State | Description |
|---|---|---|---|---|
| **1** | Processor error | Amber | On | A multibit error has occurred. |
| | | - | Off | No activity exists. |
| **2** | PMM failure | Amber | On | PPM has failed. |
| | | - | Off | Normal. |
| **3** | Fan 1 failure | Amber | On | Fan 1 has failed or is missing. |
| | | - | Off | Normal. |
| **4** | Fan 2 failure | Amber | On | Fan 2 has failed or is missing. |
| | | - | Off | Normal. |

*Table 1-5 System Board LEDs (continued)*

| LED | | Color | State | Description |
|---|---|---|---|---|
| **5** | Fan 3 failure | Amber | On | Fan 3 has failed or is missing. |
| | | - | Off | Normal. |
| **6** | PCI fan failure | Amber | On | PCI fan has failed or is missing. |
| | | - | Off | Normal. |
| **7** | Overtemperature | Amber | On | System has reached a cautionary or critical temperature level. |
| | | - | Off | Normal. |
| **8** | DIMM 4 failure | Amber | On | DIMM has failed or is missing. |
| | | - | Off | Normal. |
| **9** | DIMM 3 failure | Amber | On | DIMM has failed or is missing. |
| | | - | Off | Normal. |
| **10** | DIMM 2 failure | Amber | On | DIMM has failed or is missing. |
| | | - | Off | Normal. |
| **11** | DIMM 1 failure | Amber | On | DIMM has failed or is missing. |
| | | - | Off | Normal. |
| **12** | Reserved | - | - | - |

# System Maintenance Switch

Table 1-6 describes the functions associated with each switch on the system maintenance switch (see Item 17 of Figure 1-7).

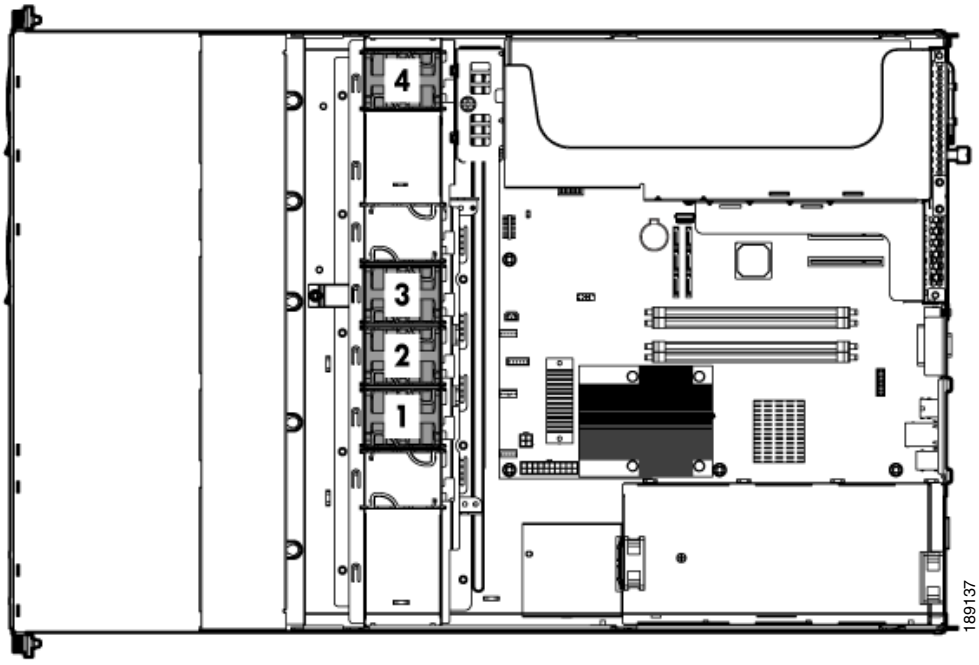
*Table 1-6 System Maintenance Switch*

| Position | Default | Function |
|---|---|---|
| S1 | Off | • Off = iLO 2 security is enabled<br>• On = iLO 2 security is disabled |
| S2 | Off | • Off = Normal operation<br>• On = RBSU will not commit any configuration changes* |
| S3 | Off | Reserved |
| S4 | Off | Reserved |
| S5 | Off | • Off = Power-on password enabled<br>• On = Power-on password disabled* |
| S6 | Off | • Off = Normal operation<br>• On = BIOS will clear CMOS and NVRAM* |
| S7 | Off | Reserved |
| S8 | Off | Reserved |

# System Board Fans

Figure 1-9 shows the location of the system board fans that provide ventilation for the chassis.

*Figure 1-9 System Board Fans*



CHAPTER 2

# Preparing to Install the Cisco MXE 3000

This chapter contains important safety information that you should know before working with the Cisco MXE 3000. Use the guidelines in this chapter to ensure your own personal safety and to help protect your appliance from potential damage.

This chapter contains the following sections:


- Safety Warnings and Cautions, page 2-1
- Safety Guidelines, page 2-2
- Environmental Requirements, page 2-4
- Power Requirements, page 2-5
- Grounding Requirements, page 2-5


**Note** Read the *Regulatory Compliance and Safety Information for Cisco Media Experience Engine 3000* document that came with your appliance before you begin the installation.

## Safety Warnings and Cautions

Before you install the Cisco MXE 3000, observe the following safety warnings and cautions:

**Warning** **Only authorized technicians trained should attempt to repair this equipment. All troubleshooting and repair procedures are detailed to allow only subassembly/module-level repair. Because of the complexity of the individual boards and subassemblies, no one should attempt to make repairs at the component level or to make modifications to any printed wiring board. Improper repairs can create a safety hazard.**

**Warning** **To reduce the risk of personal injury or damage to the equipment, be sure that: - The leveling feet are extended to the floor.**
**- The full weight of the rack rests on the leveling feet.**
**- The stabilizing feet are attached to the rack if it is a single-rack installation. - The racks are coupled together in multiple-rack installations.**
**- Only one component is extended at a time. A rack may become unstable if more than one component is extended for any reason.**

**Warning** **To reduce the risk of electric shock or damage to the equipment:**
**- Do not disable the power cord grounding plug. The grounding plug is an important safety feature.**
**- Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.**
**- Unplug the power cord from the power supply to disconnect power to the equipment.**
**- Do not route the power cord where it can be walked on or pinched by items placed against it. Pay particular attention to the plug, electrical outlet, and the point where the cord extends from the server.**

**Warning** **To reduce the risk of personal injury or damage to the equipment:**
**- Observe local occupation health and safety requirements and guidelines for manual handling.**
**- Obtain adequate assistance to lift and stabilize the chassis during installation or removal. The server is unstable when not fastened to the rails. When mounting the server in a rack, remove the power supplies and any other removable module to reduce the overall weight of the product.**

**Caution** To properly ventilate the system, you must provide at least 7.6 cm (3.0 in) of clearance at the front and back of the server.

**Caution** The server is designed to be electrically grounded (earthed). To ensure proper operation, plug the AC power cord into a properly grounded AC outlet only.

# Safety Guidelines

To reduce the risk of bodily injury, electrical shock, fire, and damage to the equipment, observe the precautions in this section.

This section contains the following topics:


- General Precautions, page 2-2
- System Reliability Considerations, page 2-3
- Working Inside the Cisco MXE 3000 with the Power On, page 2-4
- Protecting Against Electrostatic Discharge, page 2-4


## General Precautions

Observe the following general precautions for using and working with the Cisco MXE 3000:

- Observe and follow service markings. Do not service any Cisco product except as explained in your system documentation. Opening or removing covers that are marked with the triangular symbol with a lightning bolt may expose you to electrical shock. Components inside these compartments should be serviced only by a trained and qualified service technician.
- If any of the following conditions occur, unplug the product from the electrical outlet and replace the part or contact your customer service representative:
  - The power cable or plug is damaged.
  - An object has fallen into the product.

  - The product has been exposed to water.
  - The product has been dropped or damaged.
  - The product does not operate correctly when you follow the operating instructions.
- Keep your system components away from radiators and heat sources. Also, do not block cooling vents.
- Do not spill food or liquids on your system components, and never operate the product in a wet environment.
- Do not push any objects into the openings of your system components. Doing so can cause fire or electric shock by shorting out interior components.
- Use the product only with other Cisco-approved equipment.
- Allow the product to cool before removing covers or touching internal components.
- Use the correct external power source. Operate the product only from the type of power source indicated on the electrical ratings label. If you are not sure of the type of power source required, consult your service representative or local power company.
- Use only approved power cables. If you have not been provided with a power cable for your Cisco MXE 3000 or for any AC-powered option intended for your system, purchase a power cable that is approved for use in your country. The power cable must be rated for the product and for the voltage and current marked on the product's electrical ratings label. The voltage and current rating of the cable should be greater than the ratings marked on the product.
- To help prevent electric shock, plug the system components and peripheral power cables into properly grounded electrical outlets. These cables are equipped with three-prong plugs to help ensure proper grounding. Do not use adapter plugs or remove the grounding prong from a cable.
- Observe power strip ratings. Make sure that the total ampere rating of all products plugged into the power strip does not exceed 80 percent of the power strip ampere ratings limit.
- Do not use appliance or voltage converters or kits sold for appliances with your product.
- To help protect your system components from sudden, transient increases and decreases in electrical power, use a surge suppressor, line conditioner, or uninterruptible power supply (UPS).
- Position cables and power cords carefully; route cables and the power cord and plug so that they cannot be stepped on or tripped over. Be sure that nothing rests on your system components' cables or power cord.
- Do not modify power cables or plugs. Consult a licensed electrician or your power company for site modifications. Always follow your local or national wiring rules.

# System Reliability Considerations

To help ensure proper cooling and system reliability, make sure the following occurs:

- Each of the drive bays has either a drive or a filler panel installed.
- For rack configurations, make sure that space is available around the appliance to enable the cooling system to work properly. See the "Environmental Requirements" section on page 2-4, for additional information.
- A removed hot-swappable drive is replaced within 2 minutes of removal.
- A failed fan is replaced within 48 hours.

## Working Inside the Cisco MXE 3000 with the Power On

The Cisco MXE 3000 is designed to operate safely with the cover removed for short periods (less than 30 minutes). You might need to remove the cover while the power is on, for example, to observe the diagnostic LEDs when troubleshooting. When you work inside an appliance that is powered on, follow these guidelines:

- Avoid loose-fitting clothing on your forearms. Button long-sleeved shirts before working inside the appliance; do not wear cuff links while you are working inside the appliance.
- Do not allow your necktie or scarf to hang inside the appliance.
- Remove jewelry, such as bracelets, necklaces, rings, and loose-fitting wristwatches.
- Remove items from your shirt pocket (such as pens or pencils) that could fall into the appliance as you lean over it.
- Do not drop any metallic objects, such as paper clips, hairpins, or screws, into the appliance.
- Be aware that there are hazardous moving parts exposed inside the appliance when the cover is removed.

## Protecting Against Electrostatic Discharge

Static electricity can harm delicate components inside the appliance. To prevent static damage, discharge static electricity from your body before you touch any of your system's electronic components. You can do so by touching an unpainted metal surface on the chassis.

You can also take the following steps to prevent damage from electrostatic discharge (ESD):

- When unpacking a static-sensitive component from its shipping carton, do not remove the component from the antistatic packing material until you are ready to install the component in your system. Just before unwrapping the antistatic packaging, be sure to discharge static electricity from your body.
- When transporting a sensitive component, first place it in an antistatic container or packaging.
- Handle all sensitive components in a static-safe area. If possible, use antistatic floor pads and workbench pads.
- Handle the device carefully, holding it by its edges or its frame.
- Do not touch solder joints, pins, or exposed printed circuitry.
- Do not leave the device where others can handle and possibly damage the device.
- Take additional care when handling devices during cold weather, because heating reduces indoor humidity and increases static electricity.

# Environmental Requirements

To ensure continued safe and reliable equipment operation, install or position the system in a well-ventilated, climate-controlled environment.

The maximum recommended ambient operating temperature (TMRA) for most server products is 35°C (95°F). The temperature in the room where the rack is located must not exceed 35°C (95°F).

For details about the Cisco MXE 3000 environmental requirements, see Appendix A, "Cisco MXE 3000 Hardware Specifications."

# Power Requirements

Installation of this equipment must comply with local and regional electrical regulations governing the installation of information technology equipment by licensed electricians. This equipment is designed to operate in installations covered by NFPA 70, 1999 Edition (National Electric Code) and NFPA-75, 1992 (code for Protection of Electronic Computer/Data Processing Equipment).

**Warning** **To reduce the risk of personal injury, fire, or damage to the equipment, do not overload the AC supply branch circuit that provides power to the rack. Consult the electrical authority having jurisdiction over wiring and installation requirements of your facility.**

**Caution** Protect the server from power fluctuations and temporary interruptions with a regulating uninterruptible power supply (UPS). This device protects the hardware from damage caused by power surges and voltage spikes and keeps the system in operation during a power failure.

When installing more than one server, you may need to use additional power distribution devices to safely provide power to all devices. Observe the following guidelines:

- Balance the server power load between available AC supply branch circuits.
- Do not allow the overall system AC current load to exceed 80 percent of the branch circuit AC current rating.
- Do not use common power outlet strips for this equipment.
- Provide a separate electrical circuit for the server.

For details about the Cisco MXE 3000 power requirements, see Appendix A, “Cisco MXE 3000 Hardware Specifications.”

# Grounding Requirements

To ensure proper operation and safety, you must properly ground the server. In the United States, install the equipment in accordance with NFPA 70, 1999 Edition (National Electric Code), Article 250, as well as any local and regional building codes. In Canada, you must install the equipment in accordance with Canadian Standards Association, CSA C22.1, Canadian Electrical Code. In all other countries, you must install the equipment in accordance with any regional or national electrical wiring codes, such as the International Electrotechnical Commission (IEC) Code 364, parts 1 through 7. Furthermore, you must be sure that all power distribution devices used in the installation, such as branch wiring and receptacles, are listed or certified grounding-type devices.

Because of the high ground-leakage currents associated with multiple servers connected to the same power source, we recommend the use of a PDU that is either permanently wired to the building's branch circuit or includes a nondetachable cord that is wired to an industrial-style plug. NEMA locking-style plugs or those complying with IEC 60309 are considered suitable for this purpose. Using common power outlet strips for the server is not recommended.

CHAPTER 3

# Installing the Cisco MXE 3000

This chapter describes how to install a Cisco MXE 3000 in an equipment rack. This chapter contains the following sections:


- Rack-Mounting Parts, Tools, and Considerations, page 3-2
- Rack Mounting and Cabling the Cisco MXE 3000, page 3-3
- Connecting Power and Booting the System, page 3-3
- Checking the LEDs, page 3-4


Before you begin the installation, read Chapter 2, "Preparing to Install the Cisco MXE 3000" and the *Regulatory Compliance and Safety Information for Cisco Media Experience Engine 3000* document.

**Warning** **Read the installation instructions before connecting the system to the power source.** Statement 1004.

# Rack-Mounting Parts, Tools, and Considerations

A rack mounting hardware kit is included in your shipping container. To mount the Cisco MXE 3000 in the rack, you need a T-10/T-15 Torx screwdriver.

**Warning** **To prevent bodily injury when mounting or servicing this unit in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety:**

- **This unit should be mounted at the bottom of the rack if it is the only unit in the rack.**
- **When mounting this unit in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.**
- **If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.** Statement 1006

To allow for servicing and adequate airflow, observe the following space and airflow requirements when deciding where to install a rack:

- Leave a minimum clearance of 63.5 cm (25 in) in front of the rack.
- Leave a minimum clearance of 76.2 cm (30 in) behind the rack.
- Leave a minimum clearance of 121.9 cm (48 in) from the back of the rack to the back of another rack or row of racks.

The Cisco MXE 3000 draw in cool air through the front door and expel warm air through the rear door. Therefore, the front and rear rack doors must be adequately ventilated to allow ambient room air to enter the cabinet, and the rear door must be adequately ventilated to allow the warm air to escape from the cabinet.

**Caution** To prevent improper cooling and damage to the equipment, do not block the ventilation openings.

When vertical space in the rack is not filled by a appliance or rack component, the gaps between the components cause changes in airflow through the rack and across the appliances. Cover all gaps with blanking panels to maintain proper airflow.

**Caution** Always use blanking panels to fill empty vertical spaces in the rack. This arrangement ensures proper airflow. Using a rack without blanking panels results in improper cooling that can lead to thermal damage.

Observe the following additional requirements to ensure adequate airflow and to prevent damage to the equipment:

- Front and rear doors—If the 42U rack includes closing front and rear doors, you must allow 5,350 sq cm (830 sq in) of holes evenly distributed from top to bottom to permit adequate airflow (equivalent to the required 64 percent open area for ventilation).
- Side—The clearance between the installed rack component and the side panels of the rack must be a minimum of 7 cm (2.75 in).

# Rack Mounting and Cabling the Cisco MXE 3000

To install the appliance into a rack with square, round, or threaded holes, refer to the instructions that ship with the rack hardware kit.

If you are installing the appliance into a telco rack, order the appropriate option kit from the manufacturer and follow the instructions that shipped with the product to install the rack brackets.

Refer to Figure 1-3 on page 1-3 when connecting peripheral cables and power cords to the appliance.

**Warning** **To reduce the risk of electric shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into RJ-45 connectors.**

# Connecting Power and Booting the System

To connect power to your system, follow these steps:

**Step 1** Review the information in the "Safety Guidelines" section on page 2-2.

**Step 2** Plug a power cord into each power cord receptacle on the back of the appliance.

**Step 3** Connect the other end of each power cord to a power source at your installation site.

**Step 4** Power up all externally connected devices.

**Step 5** Press the power control button on the front of the appliance.

The system should begin booting. Once the operating system boots, you are ready to initialize the basic software configuration. See the *Deployment and Administration Guide for Cisco Media Experience Engine 3000* on Cisco.com for more information.

**Note** While powering up, the green power-on LED on the front of the appliance is on.

# Checking the LEDs

When the Cisco MXE 3000 is up and running, observe the front panel LEDs (see Figure 1-2 on page 1-2 and Table 1-1 on page 1-2) to verify that your system is operating properly.

To troubleshoot using the LEDs, see Chapter 5, "Troubleshooting the Cisco MXE 3000."

CHAPTER 4

# Installing Hardware Options for the Cisco MXE 3000

This chapter provides basic instructions for installing hardware options in your Cisco MXE 3000.

**Note** These instructions are intended for technicians who are experienced with setting up Cisco MXE 3000 hardware.

This chapter contains the following sections:


- Removing the Cover, page 4-1
- Removing a Hard Drive Blank, page 4-2


## Removing the Cover

**Warning** **Before working on a system that has an on/off switch, turn OFF the power and unplug the power cord.** Statement 1

To remove the device top cover, follow these steps:

**Step 1** Review the information in the "Safety Warnings and Cautions" section on page 2-1 and the "Safety Guidelines" section on page 2-2.

**Step 2** Power off the device and all attached devices and disconnect all external cables and power cords.

**Step 3** Press down on the left and right side latches and pull the device out of the rack enclosure until both slide rails lock.

**Note** You can reach the cables on the back of the device when the device is in the locked position.

**Step 4** Lift the cover-release latch. Lift the cover off the device and set the cover aside.

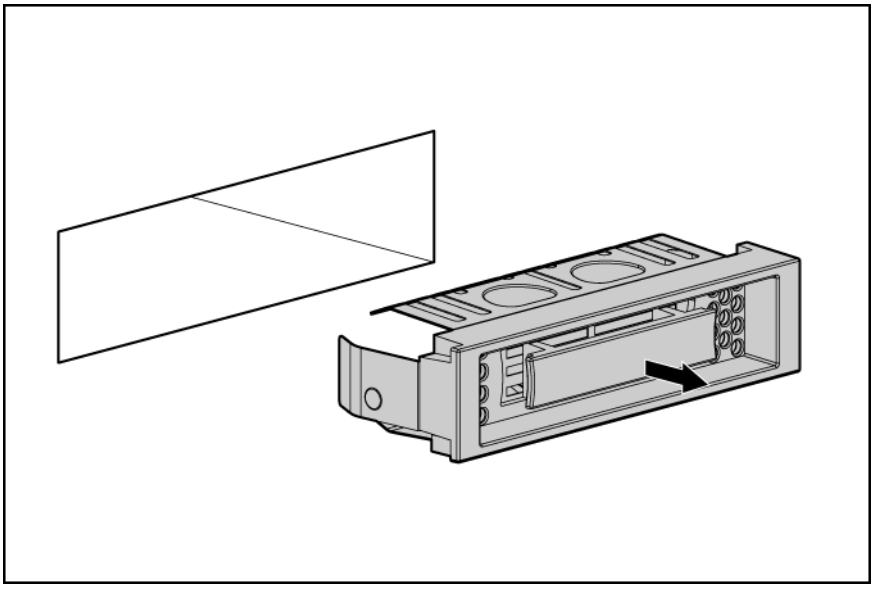
**Caution** For proper cooling and airflow, replace the cover before turning on the device. Operating the device for extended periods (over 30 minutes) with the cover removed might damage device components.

# Removing a Hard Drive Blank

**Caution** To prevent improper cooling and thermal damage, do not operate the server unless all bays are populated with either a component or a blank.

Remove the component, as shown in Figure 4-1.

*Figure 4-1 Removing a Hard Drive Blank*



CHAPTER 5

# Troubleshooting the Cisco MXE 3000

This chapter provides basic troubleshooting information to help you identify some common problems that might occur with your Cisco MXE 3000.

This chapter contains the following sections:


- Identifying System Problems, page 5-2
- Checking Connections and Switches, page 5-2
- Power-On Self Test (POST), page 5-3
- NMI Functionality, page 5-11
- Trouble Indicators and Status LEDs, page 5-11
- System LEDs and Internal Health LED Combinations, page 5-11
- Troubleshooting Undetermined Problems, page 5-12
- General Problem-Solving Tips, page 5-13
- Collecting Information for Technical Support, page 5-15


Use the information in this chapter to determine whether a problem originates with the hardware or the software. For further assistance, contact your customer service representative.

**Note** The keyboard and mouse are supported by the BIOS for power-on self-test (POST) and the diagnostic programs that are located in the device ROM.

When console redirection is enabled, all the tests available from a keyboard are accessible through the console connection as well. (Mouse support, however, is not available through the console connection.)

You can run all the diagnostics and tests that are supported by the BIOS, with a few exceptions. Tests for ports that are not supported by the Cisco MXE 3000 software are invalid.

**Caution** Components that are not orderable as spare hardware options can only be replaced by a qualified service technician. Once you have identified a faulty component, contact the Cisco Technical Assistance Center (TAC).

**Note** Read the "Working Inside the Cisco MXE 3000 with the Power On" section on page 2-4 before opening the chassis cover.

# Identifying System Problems

To identify system problems, follow these steps:

**Step 1** Check the power LED.

**Step 2** Power down the device and all external devices.

**Step 3** Check all cables and power cords. (See the "Checking Connections and Switches" section on page 5-2.)

**Step 4** Set all display controls on the terminal or display device to the middle position.

**Step 5** Power up all external devices.

**Step 6** Power up the device.

**Step 7** Record any POST error messages that are displayed on the screen. If an error is displayed, look up the first error in the "POST Error Codes" section on page 5-4.

**Step 8** If the diagnostic programs were completed successfully and you still suspect a problem, see the "Troubleshooting Undetermined Problems" section on page 5-12.

**Step 9** Check the system error log to see if an error was recorded by the system.

# Checking Connections and Switches

Improperly set switches and controls and loose or improperly connected cables are the most likely source of problems for the chassis or other external equipment. A quick check of all the switches, controls, and cable connections can easily solve these problems. (See Figure 1-1 for the location of front panel controls and indicators. See Figure 1-3 for the location of back panel connectors on the system.)

To check all the connections and switches, follow these steps:

**Step 1** Power down the system, including any attached peripherals such as external drives. Disconnect all the power cables from their electrical outlets.

**Step 2** If the system is connected to a power strip (or power distribution unit), turn the power strip off and then on again.

Is the power strip receiving power?

***Yes***. Go to Step 5.

***No***. Go to Step 3.

**Step 3** Plug the power strip into another electrical outlet.

Is the power strip receiving power?

***Yes***. The original electrical outlet probably does not function. Use a different electrical outlet.

***No***. Go to Step 4.

**Step 4** Plug a system that you know works into the electrical outlet.

Does the system receive power?

***Yes***. The power strip is probably not functioning properly. Use another power strip.

***No***. Go to Step 5.

**Step 5** Reconnect the system to the electrical outlet or power strip.

Make sure that all connections fit tightly together.

**Step 6** Power up the system.

Is the problem resolved?

***Yes***. The connections were loose. You have fixed the problem.

***No***. Call your customer service representative. (See the "Obtaining Documentation and Submitting a Service Request" section on page x.)

# Power-On Self Test (POST)

This section describes the power-on self test (POST) and the POST error codes and messages.

This section contains the following topics:


- POST Overview, page 5-3
- POST Error Codes, page 5-4


## POST Overview

When you power up the device, it performs a series of tests to check the operation of device components and some of the hardware options installed in the device. This series of tests is called the power-on self-test, or POST.

If POST finishes without detecting any problems, a single beep sounds, and the first screen of your operating system or application program appears.

If POST detects a problem, more than one beep sounds, and an error message appears on your screen. See the "POST Error Codes" section on page 5-4 for more information.

**Note** If you have a power-up password or administrator password set, you must enter the password and press **Enter** when prompted, before POST will continue.

**Note** A single problem might cause several error messages. When this situation occurs, you should correct the cause of the first error message. After you correct the cause of the first error message, the other error messages usually will not occur the next time that you run the test.

The POST error log contains the three most recent error codes and messages that the system generated during POST. The system error log contains all messages issued during POST and all system status messages from the service processor.

You can view the contents of the system error log from the diagnostic programs.

# POST Error Codes

The error messages and codes in this section include all messages generated by the Cisco MXE 3000 appliance. Some messages are informational only and do not indicate any error. A server generates only the codes that are applicable to its configuration and options.

**Warning** **To avoid potential problems, ALWAYS read the warnings and cautionary information in the server documentation before removing, replacing, reseating, or modifying system components**

### Advanced Memory Protection mode: Advanced ECC

Possible Cause: Advanced ECC support is enabled.

Action: None.

### Advanced Memory Protection mode: Advanced ECC with hot-add support

Possible Cause: Advanced ECC with Hot-Add support is enabled.

Action: None.

### Advanced Memory Protection mode: Online spare with Advanced ECC ...Xxxx MB System memory and xxxx MB memory reserved for Online Spare.

Possible Cause: This message indicates Online Spare Memory is enabled and indicates the amount of memory reserved for this feature.

Action: None.

### Advanced Memory Protection mode: Multi-board mirrored memory with Advanced ECC ...Xxxx MB System memory and xxxx MB memory reserved for Mirroring.

Possible Cause: This message indicates Mirrored Memory is enabled and indicates the amount of memory reserved for this feature.

Action: None.

### Advanced Memory Protection mode: RAID memory with Advanced ECC ...Xxxx MB System memory and xxxx MB memory reserved for RAID.

Possible Cause: This message indicates RAID Memory is enabled and indicates the amount of memory reserved for this feature.

Action: None.

### An Unexpected Shutdown occurred prior to this power-up

Possible Cause: The server shut down because of an unexpected event on the previous boot.

Action: Check the System Management Log or OS Event Log for details on the failure.

### Critical Error Occurred Prior to this Power-Up

Possible Cause: A catastrophic system error, which caused the server to crash, has been logged.

Action: If the problem persists contact your Cisco representative to arrange for repair.

### Fan Solution Not Fully Redundant

Possible Cause: The minimum number of required fans is installed, but some redundant fans are missing or failed.

Action: Install fans or replace failed fans to complete redundancy.

### Fan Solution Not Sufficient

Possible Cause: The minimum number of required fans is missing or failed.

Action: Install fans or replace any failed fans.

### Fatal DMA Error

Possible Cause: The DMA controller has experienced a critical error that has caused an NMI.

Action: If the problem persists contact your Cisco representative to arrange for repair.

### Fatal Express Port Error

Possible Cause: A PCI Express port has experienced a fatal error that caused an NMI.

Action: Reseat any loose PCI Express boards. If the problem persists contact your Cisco representative to arrange for repair.

### Fatal Front Side Bus Error

Possible Cause: The processor front-side bus experienced a fatal error.

Action: Reseat any loose processors. If the problem persists contact your Cisco representative to arrange for repair.

### Fatal Global Protocol Error

Possible Cause: The system experienced a critical error that caused an NMI.

Action: If the problem persists contact your Cisco representative to arrange for repair.

### Fatal Hub Link Error

Possible Cause: The hub link interface has experienced a critical failure that caused an NMI.

Action: If the problem persists contact your Cisco representative to arrange for repair.

### FATAL ROM ERROR: The System ROM is not Properly Programmed.

Possible Cause: The System ROM is not properly programmed.

Action: Replace the physical ROM part.

### Fibre Channel Mezzanine/Balcony Not Supported.

Description: The Fibre Channel adapter is not supported on the server.

Action: Install the supported Fibre Channel adapter.

### High Temperature Condition detected by Processor X

Possible Cause: Ambient temperature exceeds recommended levels, fan solution is insufficient, or fans have failed.

Action: Adjust the ambient temperature, install fans, or replace the failed fans.

### Illegal Opcode - System Halted

Possible Cause: The server has entered the Illegal Operator Handler because of an unexpected event. This error is often software-related and does not necessarily indicate a hardware issue.

Action: Be sure that all software is installed properly. If the problem persists contact your Cisco representative to arrange for repair.

### iLO Generated NMI

Possible Cause: The iLO controller generated an NMI.

Action: Check the iLO logs for details of the event.

### Internal CPU Check - Processor

Possible Cause: A processor has experienced an internal error.

Action: If the problem persists contact your Cisco representative to arrange for repair.

### Invalid memory types were found on the same node. Please check DIMM compatibility. - Some DIMMs may not be used

Description: Invalid or mixed memory types were detected during POST.

Action: Use only supported DIMM pairs when populating memory sockets. Refer to the applicable server user guide memory requirements.

### Invalid Password - System Halted!

Possible Cause: An invalid password was entered.

Action: Enter a valid password to access the system.

### Invalid Password - System Restricted!

Possible Cause: A valid password that does not have permissions to access the system has been entered.

Action: Enter a valid password with the correct permissions.

### Memory found on unpopulated Node. — Processor is required to be installed for memory to be used.

Description: The system detects DIMMs, but is unable to use the DIMMs because a processor is not installed in the corresponding socket.

Action: To use the installed DIMMs, install a processor in the corresponding socket.

### Mixed processor speeds detected. Please make sure that all processors are the same speed. — System Halted!

Description: Mixed processor speeds are not supported.

Action: Refer to the server documentation for supported processors. Be sure that all installed processors are the same speed.

### Network Server Mode Active and No Keyboard Attached

Possible Cause: A keyboard is not connected. An error has not occurred, but a message is displayed to indicate the keyboard status.

Action: No action is required.

### NMI - Button Pressed!

Possible Cause: The NMI button was pressed, initiating a memory dump for crash dump analysis.

Action: Reboot the server.

### NMI - Undetermined Source

Possible Cause: An NMI event has occurred.

Action: Reboot the server.

### Node Interleaving disabled - Invalid memory configuration

Description: Each node must have the same memory configuration to enable interleaving.

Action: Populate each node with the same memory configuration and enable interleaving in RBSU.

### No Floppy Drive Present

Possible Cause: No diskette drive is installed or a diskette drive failure has occurred.

Action:

**Step 1** Power down the server.

**Step 2** Replace a failed diskette drive.

**Step 3** Be sure a diskette drive is cabled properly, if a diskette drive exists.

### No Keyboard Present

Possible Cause: A keyboard is not connected to the server or a keyboard failure has occurred.

Action:

**Step 1** 1. Power down the server, and then reconnect the keyboard.

**Step 2** 2. Be sure no keys are depressed or stuck.

**Step 3** 3. If the failure reoccurs, replace the keyboard.

### Parity Check 2 - System DIMM Memory

Possible Cause: An uncorrectable error memory event occurred in a memory DIMM.

Action: Use the DIMM LEDs to identify failed DIMMs and replace the DIMMs. If the problem persists contact your Cisco representative to arrange for repair.

### PCI Bus Parity Error, PCI Slot x

Possible Cause: A PCI device has generated a parity error on the PCI bus.

Action: For plug-in PCI cards, remove the card. For embedded PCI devices, run Insight Diagnostics and replace any failed components as indicated.

### Power Fault Detected in Hot-Plug PCI Slot x

Possible Cause: PCI-X Hot Plug expansion slot was not powered up properly.

Action: Reboot the server.

### Processor X Unsupported Wattage.

Possible cause: Processor not supported by current server.

Action: Refer to the server documentation for supported processors. If the processor is supported, remove the processor, update the system to latest ROM, and then reinstall the processor.

### Redundant ROM Detected - This system contains a valid backup system ROM.

Possible Cause: The system recognizes both the system ROM and redundant ROM as valid. This is not an error.

Action: None

### REDUNDANT ROM ERROR: Backup ROM Invalid. - .....run ROMPAQ to correct error condition.

Possible Cause: The backup system ROM is corrupted. The primary ROM is valid.

Action: Run ROMPaq Utility to flash the system so that the primary and backup ROMs are valid.

### REDUNDANT ROM ERROR: Bootblock Invalid. - ... ...contact Your Representative.

Possible Cause: ROM bootblock is corrupt.

Action: Contact an authorized service provider.

### REDUNDANT ROM ERROR: Primary ROM invalid. Booting Backup ROM. -... ...run ROMPAQ to correct error condition

Possible Cause: The primary system ROM is corrupt. The system is booting from the redundant ROM.

Action: Run ROMPaq Utility to restore the system ROM to the correct version.

### Temperature violation detected - system Shutting Down in x seconds

Possible Cause: The system has reached a cautionary temperature level and is shutting down in X seconds.

Action: Adjust the ambient temperature, install fans, or replace any failed fans.

### There must be a first DIMM in pair if second DIMM in pair is populated. Second DIMM in pair ignored.

Description: The first DIMM socket in the pair is not populated. The second DIMM in the pair is not recognized or used.

Action: Populate the DIMM socket.

**This system only supports 667 MHz Front Side Bus Speed Processors. One or more 800 MHz Front Side Bus Speed Processors have been initialized at 667 MHz. System Halted!**

Possible cause: One or more 800-MHz front side bus speed processors have been initialized at 667-MHz.

Action: Correct the processor configuration.

**Unsupported DIMM(s) found in system. - DIMM(s) may not be used**

Description: Unsupported memory types found in system.

Action: Refer to the applicable server user guide memory requirements and replace with supported DIMMs.

**Unsupported PCI Card Detected Remove PCI Card from Slot**

Possible cause: The PCI card installed in the slot referenced in the message is strictly not supported on this system.

Action: Remove the card from the slot reported in the message.

**Unsupported Processor Detected System will ONLY boot ROMPAQ Utility. System Halted.**

Possible Cause: Processor and/or processor stepping is not supported by the current system ROM.

Action: Refer to the server documentation for supported processors. If a ROM version exists that supports the processor,

**Step 1** Power down the server.

**Step 2** Insert a Systems ROMPAQ diskette containing the latest ROM version.

**Step 3** Boot the system to flash the system to the latest ROM version. Allow 15 minutes for the process to complete. Successful completion is indicated by a series of beeps of increasing pitch.

**WARNING: A Type 2 Header PCI Device Has Been Detected...**
**The BIOS will not configure this card. It must be configured properly by the OS or driver.**

Possible Cause: Only Type 0 and Type 1 Header PCI Devices are configured by the system ROM. The device will not work unless the OS or device driver properly configure the card. Typically this message only occurs when PCI cards with a PCI to PCMCIA bridge are installed.

Action: Refer to the operating system documentation or the device driver information that ships with the Type 2 PCI device.

**WARNING - Mixed Stepping Processors were detected. System cannot proceed.**

Possible cause: One or more 800-MHz front side bus speed processors have been initialized at 667-MHz.

Action: Correct the processor configuration.

**301-Keyboard Error**

Possible Cause: Keyboard failure occurred.

Action:

**Step 1** Power down the server, and then reconnect the keyboard.

**Step 2** Be sure no keys are depressed or stuck.

**Step 3** If the failure reoccurs, replace the keyboard.

### 301-Keyboard Error or Test Fixture Installed

Possible Cause: Keyboard failure occurred.

Action:

**Step 1** Power down the server, and then reconnect the keyboard.

**Step 2** Be sure no keys are depressed or stuck.

**Step 3** If the failure reoccurs, replace the keyboard.

### 303-Keyboard Controller Error

Possible Cause: System board, keyboard, or mouse controller failure occurred.

Action:

**Step 1** Be sure the keyboard and mouse are connected.

**Caution** Only authorized technicians should attempt to remove the system board. If you believe the system board requires replacement, contact your support representative before proceeding.

**Step 2** If the problem persists contact your Cisco representative to arrange for repair.

### 304-Keyboard or System Unit Error

Possible Cause: Keyboard, keyboard cable, mouse controller, or system board failure.

Action:

**Step 1** Be sure the keyboard and mouse are connected.

**Caution** Only authorized technicians should attempt to remove the system board. If you believe the system board requires replacement, contact your support representative before proceeding.

**Step 2** If the problem persists contact your Cisco representative to arrange for repair.

# NMI Functionality

An NMI crash dump enables administrators to create crash dump files when a system is hung and not responding to traditional debug mechanisms.

Crash dump log analysis is an essential part of diagnosing reliability problems, such as hangs in operating systems, device drivers, and applications. Many crashes freeze a system, and the only available action for administrators is to cycle the system power. Resetting the system erases any information that could support problem analysis, but the NMI feature preserves that information by performing a memory dump before a hard reset.

To force the OS to invoke the NMI handler and generate a crash dump log, the administrator can do any of the following:

- Short the NMI jumper pins (See the "System Board Components" section on page 1-7.)
- Press the NMI switch
- Use the iLO Virtual NMI feature

# Trouble Indicators and Status LEDs

If the system error LED on the front of the device is on, one or more LEDs inside the device or on the power supply will be on. Your device has LEDs to help you identify problems with some device components. See "System Board LEDs" section on page 1-8 for the location and description of these indicators.

# System LEDs and Internal Health LED Combinations

When the internal health LED on the front panel illuminates either amber or red, the appliance is experiencing a health event. Combinations of illuminated system LEDs and the internal health LED indicate system status.

The front panel health LEDs indicate only the current hardware status. In some situations, SIM may report server status differently than the health LEDs because the software tracks more system attributes. For the location of server LEDs, see the "System Board Components and LEDs" section on page 1-6.

Table 5-1 describes the system LEDs and internal health LED combinations.

*Table 5-1 System LED and Internal LED Color Combinations and Statuses*

| System LED and Color | Internal Health LED Color | Status |
|---|---|---|
| Processor failure (amber) | Red | One or more of the following conditions may exist:<br>• Processor has failed.<br>• Processor is not installed in the socket.<br>• Processor is unsupported.<br>• ROM detects a failed processor during POST. |
| — | Amber | Processor is in a pre-failure condition. |
| PPM failure (amber) | Red | PPM has failed. |

*Table 5-1 System LED and Internal LED Color Combinations and Statuses*

| System LED and Color | Internal Health LED Color | Status |
|---|---|---|
| DIMM failure, slot X (amber) | Red | • DIMM in slot X has failed.<br>• DIMM in slot X is an unsupported type, and no valid memory exists in another bank. |
| — | Amber | • DIMM in slot X has reached single-bit correctable error threshold.<br>• DIMM in slot X is in a pre-failure condition.<br>• DIMM in slot X is an unsupported type, but valid memory exists in another bank. |
| DIMM failure, all slots in one bank (amber) | Red | No valid or usable memory is installed in the system. |
| Overtemperature (amber) | Amber | The Health Driver has detected a cautionary temperature level. |
| — | Red | The server has detected a hardware critical temperature level. |
| Fan module (red) | Red | The minimum fan requirements are not being met in one or more of the fan modules. One or more fans have failed or are missing. |
| Power supply signal interlock (amber) | Red | The power supply signal cable is not connected to the system board. |

# Troubleshooting Undetermined Problems

Use the information in this section if the diagnostic tests did not identify the failure, the devices list is incorrect, or the system is inoperative.

**Note** Damaged data in CMOS can cause undetermined problems.

**Note** Damaged data in BIOS code can cause undetermined problems.

Check the LEDs on all the power supplies. If the LEDs indicate the power supplies are working correctly, follow these steps:

**Step 1** Power down the device.

**Step 2** Be sure the device is cabled correctly.

**Step 3** Remove or disconnect the following devices (one at a time) until you find the failure (power up the device and reconfigure it each time):

- Any external devices
- Surge suppressor device (on the device)

- Modem, printer, mouse, or non-Cisco devices
- Each adapter
- Disk drives
- Memory modules (minimum requirement = 4 GB; two banks of 2 GB DIMMs)

**Note** Any component that is internal to the device, with the exception of customer-replaceable adapters, must be serviced by trained and qualified personnel. Contact your customer service representative.

**Step 4** Power up the device. If the problem remains, check the following parts in the order listed:

a. Power backplane

b. System board

**Note** If the problem goes away when you remove an adapter from the system, and replacing that adapter does not correct the problem, check the system board.

**Note** If you suspect a networking problem and all the system tests pass, check if there is a network cabling problem external to the system.

# General Problem-Solving Tips

This section contains the following topics:


- Server Power-On Problems, page 5-13
- POST Problems, page 5-14
- Server Fault Indications, page 5-14


## Server Power-On Problems

Symptoms:

- The server does not power on.
- The system power LED is off or amber.
- The external health LED is red or amber.
- The internal health LED is red or amber.

**Note** For the location of server LEDs, see the "System Board Components and LEDs" section on page 1-6.

Possible causes:

- Improperly seated or faulty power supply
- Loose or faulty power cord
- Power source problem
- Power on circuit problem
- Improperly seated component or interlock problem
- Faulty internal component

See the "Checking Connections and Switches" section on page 5-2.

# POST Problems

Symptoms:

- Server does not complete POST

**Note** The server has completed POST when the system attempts to access the boot device.

- Server completes POST with errors

Possible problems:

- Improperly seated or faulty internal component
- Faulty KVM device
- Faulty video device

See the "Power-On Self Test (POST)" section on page 5-3.

# Server Fault Indications

Symptoms:

- Server boots, but the internal health LED, external health LED, or component health LED is red or amber

**Note** For the location of server LEDs, see the "System Board Components and LEDs" section on page 1-6.

Possible causes:

- Improperly seated or faulty internal or external component
- Unsupported component installed
- Redundancy failure
- System overtemperature condition

See the "Troubleshooting Undetermined Problems" section on page 5-12.

# Collecting Information for Technical Support

Because of the variety of hardware and software combinations that can be encountered, use the following information to assist you in identifying the problems. Have this information available when requesting technical assistance.

For information about submitting a service request, see the "Obtaining Documentation and Submitting a Service Request" section on page x.

- Machine type and model
- Microprocessor or hard disk upgrades
- Failure symptom
  - Do diagnostics fail?
  - What, when, where; single or multiple systems?
  - Is the failure repeatable?
  - Has this configuration ever worked?
  - If it has been working, what changes were made before it failed?
  - Is this the original reported failure?
- Diagnostics type and version level
- Hardware configuration
  - Print (print screen) configuration currently in use
  - BIOS level
- Operating system software type and version level

To eliminate confusion, identical systems are considered identical only if they meet all these conditions:

- Are the exact machine type and models
- Have the same BIOS level
- Have the same adapters or attachments in the same locations
- Have the same address jumpers, terminators, and cabling
- Have the same software versions and levels
- Have the same diagnostics code
- Have the same configuration options set in the system
- Have the same setup for the operating system control files

Comparing the configuration and software setup in working and nonworking systems might help to resolve the problem.

APPENDIX A

# Cisco MXE 3000 Hardware Specifications

This appendix provides hardware specifications for the Cisco MXE 3000 appliance. It contains the following sections:


- Environmental Specifications, page A-1
- Server Specifications, page A-2


## Environmental Specifications

Table A-1 provides the environmental specifications for the Cisco MXE 3000 appliance.

*Table A-1 Environmental Specifications*

| Specification | Value |
|---|---|
| **Temperature** | — |
| Operating[1] | 10° C to 35° C (50° F to 90° F) |
| Non-operating | 30° C to 60° C (-22° F to 140° F) |
| **Maximum Rate of Temperature Change** | — |
| Operating [2,3] | 10°C/hr (18°F/hr) |
| Non-operating | 20°C/hr (36°F/hr) |
| **Relative Humidity (Noncondensing)** | — |
| Operating | 10% to 90% |
| Non-operating | 5% to 95% |
| **Maximum Wet Bulb Temperature (Noncondensing)** | — |
| Operating | 28° C (82.4° F) |
| Non-operating | 38.7°C (101.7°F) |
| **Altitude** | — |
| Operating[2] | 3,050 m (10,000 ft) |
| Non-operating | 9144 m (30,000 ft) |
| **Maximum Rate of Altitude Change** | — |

*Table A-1 Environmental Specifications*

| | |
|---|---|
| Operating | 457 m/min (1,500 ft/min) |
| Non-operating | 457 m/min (1,500 ft/min) |

1. All temperature ratings shown are for sea level. An altitude derating of 1°C per 300 m (1.8°F per 1,000 ft) to 3048 m (10,000 ft) is applicable. No direct sunlight allowed.
2. The type and number of options installed can limit the upper limit.
3. System performance may be reduced if operating with a fan fault above 30ºC (86ºF).

# Server Specifications

Table A-2 provides the server specifications for the Cisco MXE 3000 appliance.

*Table A-2 Server Specifications*

| Specification | Value |
|---|---|
| **Dimension** | — |
| Height | 4.32 cm (1.70 in) |
| Depth | 68.20 cm (26.85 in) |
| Width | 44.80 cm (17.64 in) |
| Weight (maximum configuration: all hard drives, power supplies, and processors installed) | 15.20 kg (33.50 lb) |
| Weight (minimum configuration: one hard drive, power supply, and processor installed) | 11.79 kg (26.0 lb) |
| **Input Requirement**[1] | — |
| Rated line voltage | 90 VAC to 264 VAC |
| Rated input frequency | 47 Hz to 63 Hz |
| Rated input current | 6.5 A (100 VAC)<br>3 A (200 VAC) |
| Rated input power | 527 W (115/230 $V_{RMS}$) |
| BTUs per hour | 1836 BTU (100 VAC)<br>1706 BTU (200 VAC) |
| **Power Supply Output** | — |
| Rated steady-state power | 400 W (100 VAC) |
| | 400 W (200 VAC) |
| Maximum peak power | 400 W (100 VAC) |
| | 400 W (200 VAC) |
| **Acoustic Noise**[2] | — |
| Idle | $L_{WAd}$—6.30 B<br>$L_{pAm}$—44.1dB |
| Operating | $L_{WAd}$—6.34 B<br>$L_{pAm}$—44.4 dB |

1. The limits apply when operated in an ambient environment temperature of +23.0°C ± 2° (+73.4°F ± 2°).
2. Average A-Weighted sound power levels (LWAd) and average bystander position A-Weighted sound pressure levels (LpAm) in a 23°C ambient environment, measured in accordance with ISO 7779 (ECMA 74) and declared in accordance with ISO 9296 (ECMA 109). Acoustic noise levels are maximum measurements with four fans installed.

APPENDIX B

# Maintaining the Cisco MXE 3000

Proper use of preventive maintenance procedures can keep the Cisco MXE 3000 in good operating condition and minimize the need for costly, time-consuming service procedures. This chapter contains maintenance procedures that you should perform regularly.

This chapter covers the tasks required for maintaining a Cisco MXE 3000:


- Maintaining Your Site Environment, page B-1
- Using Power Protection Devices, page B-5


## Maintaining Your Site Environment

An exhaust fan in the power supply cools the power supply and system by drawing air in through various openings in the system and blowing it out the back. However, the fan also draws dust and other particles into the system, causing contaminant buildup, which results in an increase in the system's internal temperature and interferes with the operation of various system components.

To avoid these conditions, we recommend keeping your work environment clean to reduce the amount of dust and dirt around the system, thereby reducing the amount of contaminants drawn into the system by the power supply fan.

This section discusses various environmental factors that can adversely affect system performance and longevity.


- Temperature, page B-2
- Humidity, page B-2
- Altitude, page B-2
- Dust and Particles, page B-3
- Corrosion, page B-3
- Electrostatic Discharge, page B-3
- Electromagnetic and Radio Frequency Interference, page B-3
- Magnetism, page B-4
- Shock and Vibration, page B-4
- Power Source Interruptions, page B-4

# Temperature

Temperature extremes can cause a variety of problems, including premature aging and failure of chips or mechanical failure of devices. Extreme temperature fluctuations can cause chips to become loose in their sockets and can cause expansion and contraction of disk drive platters, resulting in read or write data errors.

To minimize the negative effects of the temperature on system performance, follow these guidelines:

- Ensure that the system is operated in an environment no colder than 50° F (10° C) or hotter than 95° F (35° C).
- Ensure that the system has adequate ventilation. Do not place it within a closed-in wall unit or on top of cloth, which can act as insulation. Do not place it where it will receive direct sunlight, particularly in the afternoon. Do not place it next to a heat source of any kind, including heating vents during winter.

Adequate ventilation is particularly important at high altitudes. System performance may not be optimum when the system is operating at high temperatures as well as high altitudes.

- Make sure that all slots and openings on the system remain unobstructed, especially the fan vent on the back of the system.
- Clean the system at regular intervals to avoid any buildup of dust and debris, which can cause a system to overheat.
- If the system has been exposed to abnormally cold temperatures, allow a 2-hour warm-up period to bring it up to a normal operating temperature before turning it on. Failure to do so may cause damage to internal components, particularly the hard disk drive.
- If intermittent system failures are noticed, try reseating any socketed chips, which might have become loose because of temperature fluctuations.

# Humidity

High-humidity conditions can cause moisture migration and penetration into the system. This moisture can cause corrosion of internal components and degradation of properties such as electrical resistance and thermal conductivity. Extreme moisture buildup inside the system can result in electrical shorts, which can cause serious damage to the system.

Each system is rated to operate at 8 to 80 percent relative humidity, with a humidity gradation of 10 percent per hour. Buildings in which climate is controlled by air conditioning in the warmer months and by heat during the colder months usually maintain an acceptable level of humidity for system equipment. However, if a system is located in an unusually humid location, a dehumidifier can be used to maintain the humidity within an acceptable range.

# Altitude

Operating a system at high altitude (low pressure) reduces the efficiency of forced and convection cooling and can result in electrical problems related to arcing and corona effects. This condition can also cause sealed components with internal pressure, such as electrolytic capacitors, to fail or perform at reduced efficiency.

Each system is designed to operate at a maximum altitude of 3000 feet (914.4 meters) and can be stored at a maximum altitude of 7000 feet (2133 meters).

# Dust and Particles

A clean operating environment can greatly reduce the negative effects of dust and other particles, which act as insulators and interfere with the operation of a system's mechanical components. In addition to regular cleaning, you should follow these guidelines to deter contamination of the system equipment:

- Do not permit smoking anywhere near the system.
- Do not permit food or drink near the system.
- Use dust covers when the system is not in use.
- Close windows and outside doors to keep out airborne particles.

# Corrosion

The oil from a person's fingers or prolonged exposure to high temperature or humidity can corrode the gold-plated edge connectors and pin connectors on various devices in the system. This corrosion on system connectors is a gradual process that can eventually lead to intermittent failures of electrical circuits.

To prevent corrosion, you should avoid touching contacts on boards and cards. Protecting the system from corrosive elements is especially important in moist and salty environments, which tend to promote corrosion. Also, as a further deterrent to corrosion, the system should not be used in extreme temperatures, as explained in the "Temperature" section on page B-2.

# Electrostatic Discharge

Electrostatic discharge (ESD) results from the buildup of static electricity on the human body and certain other objects. This static electricity is often produced by simple movements such as walking across a carpet. ESD is a discharge of a static electrical charge that occurs when a person whose body contains such a charge touches a component in the system. This static discharge can cause components, especially chips, to fail. ESD is a problem particularly in dry environments where the relative humidity is below 50 percent.

To reduce the effects of ESD, you should observe the following guidelines:

- Wear a grounding wrist strap. If a grounding wrist strap is unavailable, touch an unpainted metal surface on the chassis periodically to neutralize any static charge.
- Keep components in their antistatic packaging until they are installed.
- Avoid wearing clothing made of wool or synthetic materials.

# Electromagnetic and Radio Frequency Interference

Electromagnetic interference (EMI) and radio frequency interference (RFI) from a system can adversely affect devices such as radio and television (TV) receivers operating near the system. Radio frequencies emanating from a system can also interfere with cordless and low-power telephones. Conversely, RFI from high-power telephones can cause spurious characters to appear on the system's monitor screen.

RFI is defined as any EMI with a frequency above 10 kilohertz (kHz). This type of interference can travel from the system to other devices through the power cable and power source or through the air like transmitted radio waves. The Federal Communications Commission (FCC) publishes specific regulations to limit the amount of EMI and RFI emitted by computing equipment. Each system meets these FCC regulations.

To reduce the possibility of EMI and RFI, follow these guidelines:

- Operate the system only with the system cover installed.
- Ensure that the screws on all peripheral cable connectors are securely fastened to their corresponding connectors on the back of the system.
- Always use shielded cables with metal connector shells for attaching peripherals to the system.

# Magnetism

Because they store data magnetically, hard disk drives are extremely susceptible to the effects of magnetism. Hard disk drives should never be stored near magnetic sources such as the following:

- Monitors
- TV sets
- Printers
- Telephones with real bells
- Fluorescent lights

# Shock and Vibration

Excessive shock can damage the function, external appearance, and physical structure of a system. Each system has been designed to operate properly even after withstanding a minimum of six consecutively executed shock pulses in the positive and negative x, y, and z axes (one pulse on each side of the system). Each shock pulse can measure up to 5 gravities (G) for up to 11 milliseconds (ms). In storage, the system can withstand shock pulses of 20 G for 11 ms.

Excessive vibration can cause the same problems as mentioned earlier for shock, as well as causing components to become loose in their sockets or connectors. Systems can be subject to significant vibration when being transported by vehicle or when operated in an environment with machinery that causes vibration.

# Power Source Interruptions

Systems are especially sensitive to variations in voltage supplied by the AC power source. Overvoltage, undervoltage, and transients (or spikes) can erase data from memory or even cause components to fail. To protect against these types of problems, power cables should always be properly grounded and one or both of the following methods should be used:

- Use one of the power protection devices described in the "Using Power Protection Devices" section on page B-5.
- Place the system on a dedicated power circuit (rather than sharing a circuit with other heavy electrical equipment). In general, do not allow the system to share a circuit with any of the following:

- Copier machines
- Air conditioners
- Vacuum cleaners
- Space heaters
- Power tools
- Teletype machines
- Adding machines
- Laser printers
- Facsimile machines
- Any other motorized equipment

Besides these appliances, the greatest threats to a system's supply of power are surges or blackouts caused by electrical storms. Whenever possible, turn off the system and any peripherals and unplug them from their power sources during thunderstorms.

If a blackout occurs—even a temporary one—while the system is turned on, turn off the system immediately and disconnect it from the electrical outlet. Leaving the system on may cause problems when the power is restored; all other appliances left on in the area can create large voltage spikes that can damage the system.

# Using Power Protection Devices

A number of devices are available that protect against power problems such as power surges, transients, and power failures. The following subsections describe some of these devices:


- Surge Protectors, page B-5
- Line Conditioners, page B-5
- Uninterruptible Power Supplies, page B-6


## Surge Protectors

Surge protectors are available in a variety of types and usually provide a level of protection commensurate with the cost of the device. Surge protectors prevent voltage spikes, such as those caused during an electrical storm, from entering a system through the electrical outlet. Surge protectors, however, do not offer protection against brownouts, which occur when the voltage drops more than 20 percent below the normal AC line voltage level.

## Line Conditioners

Line conditioners go beyond the overvoltage protection of surge protectors. Line conditioners keep a system's AC power source voltage at a fairly constant level and therefore can handle brownouts. Because of this added protection, line conditioners cost more than surge protectors—up to several hundred dollars. However, these devices cannot protect against a complete loss of power.

# Uninterruptible Power Supplies

Uninterruptible power supply (UPS) systems offer the most complete protection against variations in power because they use battery power to keep the system running when AC power is lost. The battery is charged by the AC power while it is available, so once AC power is lost, the battery can provide power to the system for a limited amount of time—from 15 minutes to an hour or so—depending on the UPS system.

UPS systems range in price from a few hundred dollars to several thousand dollars, with the more expensive units allowing you to run larger systems for a longer period of time when AC power is lost. UPS systems that provide only 5 minutes of battery power let you conduct an orderly shutdown of the system but are not intended to provide continued operation. Surge protectors should be used with all UPS systems, and the UPS system should be Underwriters Laboratories (UL) safety-approved.

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